CLAIMS

1. A waveguide rotator for use with a dual polarisation waveguide probe system for receiving at least two signals which are orthogonally polarised, said system having a waveguide into which at least two orthogonally polarised signals are received for transmission therealong, said waveguide having:

a first probe extending from a wall of the waveguide into the interior of the waveguide, said first probe being adapted to receive a first polarised signal travelling in the same longitudinal plane thereof,

signal isolation means extending from the wall of the waveguide and said isolating means being located downstream of said first probe lying in said longitudinal plane for reflecting the first polarised signal in said longitudinal plane back to said probe means and allowing a second polarised signal, orthogonal to said first polarised signal to pass along said waveguide,

second probe means located downstream of said signal isolating means and extending from the wall of the waveguide in said longitudinal plane,

signal rotator means disposed in said waveguide downstream of said second probe means and having a protruding surface extending from an interior surface of said waveguide partly across said waveguide towards a short circuit disposed at an end of said waveguide, said signal rotator means being dimensioned and proportioned such that an incident polarisation component of said second polarisation signal propagates to the short circuit at the end of the waveguide and is reflected therefrom and a second incident polarisation component is cut-off by said protruding surface and before reaching the short circuit, and is reflected substantially by said protruding surface at a frequency dependent cut-off point whereby said reflected first and second components recombine within said waveguide such that the polarisation of the reflected signal is rotated by 90°

from the incident polarisation such that the reflected polarised signal is in said longitudinal plane for detection by said second probe means.

2. A waveguide rotator as claimed in claim 1 wherein a wedge-shaped protrusion is located into the short circuit end of the waveguide for rotating a polarised signal 90°, that is, vertical to horizontal polarity or vice-versa by introducing a phase shift between the two components of the incident signal.

3. A waveguide rotator as claimed in claim 1 or 2 wherein the waveguide cross-section is substantially square.

4. A waveguide rotator as claimed in claim 1 or 2 wherein the waveguide cross-section is rectangular or circular.

5. A waveguide rotator as claimed in any preceding claim wherein the wedge-shaped protrusion extends substantially across the width of the waveguide and narrows to a common location on the waveguide wall to provide a substantially planar surface between the waveguide wall and the rear waveguide reflecting wall.

6. A waveguide as claimed in any one of claims 1 to 4 wherein the waveguide wedge-shaped protrusion has cut-outs so that it does not extend completely across the width of the waveguide at the rear reflecting wall.

7. A waveguide rotator as claimed in any one of claims 1 to 4 wherein the wedge is stepped, the wedge being formed by a series of triangular protrusions of increasing waveguide width.

8. A waveguide rotator as claimed in any one of claims 1 to 4 wherein the waveguide rotator is provided by dual wedge-shaped protrusions on opposed sides of the waveguide.

9. A waveguide rotator as claimed in claim 8 wherein one or both dual wedges may be stepped.

10. A method of rotating a polarised signal travelling in a waveguide having a short circuit at one end by

substantially 90°, said method comprising the steps of,

providing a protrusion in a waveguide, said protrusion extending partially across said waveguide cavity,

allowing a first component of said polarised signal to travel to the short circuit at the end of said waveguide and be reflected from said end back along the waveguide,

increasing the wavelength of a second component of said polarised signal by decreasing the width of said waveguide by said protrusion,

reflecting said second component from the protrusion at a frequency dependent cut-off point before said second component reaches said short circuit,

recombining the reflected first and second components in said waveguide whereby said recombined polarised signal is rotated substantially 90° from the polarisation of the incident signal.

11. A low-noise block (LNB) for use with a satellite dish receiving signals broadcast by a satellite which includes two signals orthogonally polarised in the same frequency band, said LNB comprising:

a feedhorn,

a waveguide coupled to said feedhorn, said waveguide having a printed circuit board support surface and a short circuit end plate,

a printed circuit board mounted on said support surface and having first and second probes extending into said waveguide, said probes being disposed in the same longitudinal plane,

a second rotator structure disposed within said waveguide between said second probe and said short circuit end plate, said signal rotator structure narrowing the waveguide to a component of a polarised signal to increase the wavelength of the component and reflect the component at a frequency dependent cut-off point before it reaches the short circuit, and permitting

an orthogonal component of said polarised signal to be reflected by said short circuit, the reflected components being recombined within said waveguide before reaching said second probe whereby the recombined polarised signal rotates 90° from the polarisation of the incident signal into the same longitudinal plane as said probes.